the 12th, 14th, and 15th; that on the 14th being, with one exception, the highest observed since 1869.

High tides were also observed as follows:

Ocean City, Maryland, 8th.

Jacksonville, Florida, from 15th to 18th.

Indianola, Texas, 28th.

WATER TEMPERATURE.

The following table gives the highest and lowest temperatures of the water at the several stations; the range of water temperature; the mean temperature of the air at the station; and the depth of water at which the observations are taken:

Temperature of water for September, 1884.

Station.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.				
	°	°	°	ft.	in.	°
Atlantic City, New Jersey	75.0	69.5	5.5	2	8	69.7
Alpena, Michigan	72.3	55.8	10.5	12	0	60.5
Augusta, Georgia	84.8	78.0	6.8	5	0	76.4
Baltimore, Maryland	81.2	71.9	9.3	10	0	72.1
Block Island, Rhode Island	68.2	60.7	7.5	7	6	65.3
Boston, Massachusetts	65.5	57.1	8.4	21	2	65.8
Buffalo, New York	75.0	65.4	9.6	9	11	65.6
Canby, Fort, Washington Territory	62.5	50.7	11.8	16	10	55.3
Cedar Keys, Florida	86.2	79.9	6.3	10	10	80.3
Charleston, South Carolina	83.2	75.2	8.0	39	4	77.2
Chicago, Illinois	66.9	58.7	8.2	8	0	68.9
Chincoteague, Virginia	82.4	68.5	13.9	4	0	71.8
Cleveland, Ohio	75.1	64.3	10.8	14	0	67.3
Detroit, Michigan	75.6	62.9	12.7	23	10	68.4
Delaware Breakwater, Delaware	76.7	68.2	8.5	8	10	70.6
Duluth, Minnesota	65.1	52.4	12.7	10	2	57.5
Eastport, Maine	52.0	50.5	1.5	14	11	50.5
Escanaba, Michigan	66.0	59.1	6.9	18	3	60.1
Galveston, Texas	87.3	80.2	7.1	12	11	83.5
Grand Haven, Michigan	77.5	64.2	13.3	19	0	65.4
Indianola, Texas	86.2	77.5	8.7	9	3	81.0
Jacksonville, Florida	85.2	79.8	5.4	18	0	77.8
Key West, Florida	87.9	81.7	6.2	17	3	82.2
Mackinaw City, Michigan	65.1	56.2	8.9	10	0	60.6
Macon, Fort, North Carolina	84.0	70.6	13.4	8	10	75.5
Marquette, Michigan	60.5	55.6	4.9	10	0	59.9
Milwaukee, Wisconsin	57.8	43.1	14.7	8	0	64.0
Mobile, Alabama	85.6	80.0	5.6	17	2	78.3
New Haven, Connecticut	76.7	65.0	11.7	16	0	66.4
New London, Connecticut	69.6	64.2	5.4	12	6	66.9
New York City	74.4	67.4	7.0	16	2	69.6
Norfolk, Virginia	80.8	72.7	8.1	16	5	73.9
Pensacola, Florida	85.3	82.3	3.0	17	8	79.5
Portland, Maine	59.8	54.4	5.4	15	3	64.0
Portland, Oregon	71.0	56.5	14.5	53	6	55.7
Sandusky, Ohio	79.0	62.5	16.5	10	3	68.8
Sandy Hook, New Jersey	75.3	64.0	11.3	1	8	70.4
San Francisco, California	60.9	57.5	3.4	37	5	58.3
Savannah, Georgia	84.3	76.0	8.3	10	8	76.4
Smithville, North Carolina	82.5	73.0	9.5	10	9	75.9
Toledo, Ohio	77.6	65.7	11.9	11	2	69.3
Wilmington, North Carolina	82.0	72.0	10.0	20	1	75.2

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for September, 1884, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 81.58 per cent. The percentages for the four elements are: Weather, 88.64; direction of the wind, 77.00; temperature, 77.89; barometer, 84.49 per cent. By geographical districts, they are: For New England, 78.28; middle Atlantic states, 83.87; south Atlantic states, 88.42; eastern Gulf states, 86.67; western Gulf states, 86.20; lower lake region, 77.39; upper lake region, 77.97; Ohio valley and Tennessee, 84.77; upper Mississippi valley, 78.52; Missouri valley, 72.64; north Pacific coast region, 83.33; middle Pacific coast region, 90.83; south Pacific coast region, 98.33. There were five omissions to predict out of 2,948, or 0.17 per cent. Of the 2,943 predictions that have been made, ninety-eight, or 3.33 per cent., are considered to have entirely failed; one hundred and sixty-seven, or 5.68 per cent., were one-fourth verified; three hundred and fifty-four, or 12.03 per cent., were one-half verified; five hundred and sixty-seven, or 19.26 per cent., were three-fourths verified; 1,757, or 59.70 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During September, 1884, one hundred and forty cautionary signals were ordered. Of these, ninety-one, or 65.0 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Twenty-six offshore signals were ordered, of which number sixteen, or 61.54 per cent., were fully justified, both as to direction and velocity; twenty, or 76.92 per cent., were justified as to direction; and twenty-one, or 80.77 per cent., were justified as to velocity. One hundred and sixty-six signals of all kinds were ordered, one hundred and seven, or 64.46 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Three signals were ordered late. In sixty-four cases winds of twenty-five miles or more per hour were reported, for which no signals were ordered.

Concerning the system of indicating the weather changes by means of railway signals, Professor Mell, director of the "Alabama Weather Service," states that this system has been in successful operation over a large part of that state, and that the reports received by him indicate that much interest is manifested wherever the signals have been displayed. These signals were displayed from the 11th to the close of the month, and a high percentage of verification was attained. Out of the reports from nine stations, six reported that the indications referring to temperature were fully verified; five reported the indications referring to the character of the weather fully verified; and the remaining stations reported percentages of accuracy varying from 85 to 95 per cent.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Brilliant and extensively observed auroral displays occurred on the evenings of the 13th and 17th; that which occurred on the last-mentioned date being observed throughout the northern portions of the United States and in British America. It was seen at Sidney, Nova Scotia, on the east; at stations on the coasts of Oregon and Washington Territory on the west; and southward to stations in southern Illinois and Indiana, and the central portions of Ohio and Kansas.

The display on the 13th, was not observed to the west of Dakota but was reported by numerous stations from the upper Missouri valley eastward to the Atlantic coast. The following reports relate to the display:

Eastport, Maine, 13th: an auroral arch was visible from 7.50 p. m. until 2 a. m. of the 14th; it extended to an altitude of 25°; several streamers of whitish color were observed during the display.

Point Judith, Rhode Island, 13th: a faint auroral light appeared at 7.50 p. m.; at 8.10 p. m. an arch of pale straw color formed, and remained visible until after midnight; the arch extended from northwest to northeast, being about 5° in width and 12° altitude; a dark haze was observed beneath the arch; no streamers were seen.

Menand Station (near Albany), New York: at 10.15 p. m., on the 13th, auroral beams of from 5° to 10° altitude were observed.

Moorestown, New Jersey: from 10.45 to 11.15 p., m. on the 13th, a few auroral streamers were observed.

Oswego, New York: an auroral light of pale straw color appeared at 10.50 p. m.; only a few streamers were noticed; the light faded gradually and by 12.50 a. m. it had entirely disappeared.

Rochester, New York: from 9.30 to 10.10 p. m., on the 13th, an aurora was visible in the northern sky; beams of light suddenly shot upward to a height of 45° and were followed by a wave of light having a slow motion from west to east.

Thornville, Michigan: a faint auroral display was visible from 9 to 11 p. m., on the 13th.

Riley, Illinois: a poorly-defined auroral arch of unusual brilliancy was observed at 10 p. m., on the 13th.